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PART VI.

OFFICIAL PAPERS.

Memorandum drawn up by Mr. C. Dove Wilson on transhipment owing to break of gauge between metre and 2 ft. 6 ins. gauge Railways.

Within the limits of the Mysore State the total mileage of railways open for traffic is 513 miles. No less than four different gauges are in use the mileages being :—

5′—6″ gauge	...	61 miles.
Metre ,,	...	401 ,,
2′—6″ ,,	...	39 ,,
2′—0″ ,,	...	12 ,,
Total	...	513 miles.

Compared with the area and population of this fertile and rich State the provision of railways is extremely small. A comparison with an European country may be hardly reasonable but is of interest when the rapidity with which the State is increasing its agricultural, industrial and educational development is taken into consideration. The area of the main-land of Scotland is practically the same as that of Mysore—29,478 square miles—while the population is less, being 4¾ millions

as compared with 5½ millions. A large part of Scotland consists of mountainous, poor, country sparsely inhabited, which may from a Railway point of view be compared with the Malnad tracts of Mysore, yet in Scotland we have 3,172 miles of railway open as compared with only 513 miles in Mysore. In spite of the difficult nature of the country and its small commercial value the railways in the Highlands are all of the same gauge as the railways in the rich and prosperous Lowlands, and although several light railways have been constructed to assist the agriculturist they have all been on the Standard gauge of 4 feet 8½ inches.

It may be accepted that an extension of railway facilities is essential to the progress of the State and bearing in mind that that the first requirement of a railway is to reduce and keep to the lowest limit possible the cost of transportation of goods between the producer and the consumer, and also to enable the villagers to travel at a cost which will cause them to prefer the railway to the road, the first cost and working expenses must be kept as low as possible. In lines of comparatively small earning capacity it is just as important to keep down working expenses as it is to keep down capital cost. The margin of profit is very small and a small rise in the percentage of working expenses to gross receipts may convert a paying concern into a commercial loss. How small this margin is is shown in the following examples:—

Take a railway earning Rs. 64 a mile a week. The gross receipts a mile per annum are Rs. 3,328 and if the line is worked at 50 per cent of the gross receipts, the net receipts a mile are Rs. 1,664 or 4·16 per cent on a capital cost of Rs. 40,000 a mile.

If the working expenses are 60 per cent of the gross receipts the net earnings are only Rs. 1,331 a mile or 3·3 per cent of the same capital cost. Taking the receipts to be the same, that is at Rs. 64 a mile a week, a railway costing Rs. 50,402 a mile if worked at 50 per cent of gross receipts will give up the same return on its capital cost, that is 3·3 per cent, as a railway costing Rs. 40,000 a mile if worked at 60 per cent of its gross receipts.

If the line costing Rs. 40,000 a mile cannot be worked for less than 60 per cent of the gross receipts then the earnings must be Rs. 80 a mile a week to give a return of 4·16 per cent on the Capital. The problem before the management of this line is therefore either to reduce the working expenses from 60 to 50 per cent of receipts or else to raise the earnings from Rs. 64 a mile a week to Rs. 80.

Apart from the question of working expenses, it is an undoubted fact known to all railway men that in the case of a feeder line a break of gauge is an obstruction to the free flow of traffic. At first sight the objections to a break of gauge appear to be unreasonable. The cost of transhipment on the average may be taken at about 1¼ anna a ton and is equivalent to a haulage of from three to six miles according to the class of goods. No direct charge is made for this and traders probably do not feel it, although of course they pay for it indirectly. Also on all railways, there is a lot of transhipment done between wagons of the same gauge and we hear no special complaint about it. The evils of a break of gauge are no doubt exaggerated by the public but wherever it occurs we have complaints about damage, delay and pilfering, and goods will go by cart that should be carried by the railway. These complaints and objections are not confined to small traders and villagers, large firms are also strongly antagonistic as is evidenced by the vigorous protests raised in the Rangoon Chamber of Commerce a few years ago, when Mr. Wood of the Railway Board tried to persuade them to agree to the Shan State extension of the Burmah Railway being built on the 2 feet 6 inches gauge. Nor does custom seem to inspire confidence, and there is no reason to believe that a break of gauge will not always be looked on as a nuisance.

It is, I think, an accepted fact that Indian Railways as a whole have suffered from the policy of having two gauges—the 5 feet 6 inches and the metre. In 1903, Mr. Shadbolt, one of our ablest railway engineers, when giving evidence before a Commission in Madras advocated the conversion of all railways in India to the 4 feet 8½ inches gauge and pointed out that as years went by and new railways are made these difficulties will only increase. This has happened, and

although the cost of conversion per mile would not be much the total cost is now prohibitive. In the United States in 1883 there were no less than nine different gauges in use, but within ten years the whole of them were brought to a single standard involving the conversion of a length of close on 20,000 miles. In England, the Great Western Railway converted its magnificient 7 feet gauge track to the standard to avoid break of gauge.

"Capital" the leading commercial paper in India, in a leading article on the 5th November 1915 alludes to the "distraction of transhipment" and says that, by keeping the 5 feet 6 inches and metre gauge systems to their own spheres as far as possible, "India has endeavoured to overcome the early errors of construction due to the mixed gauge policy and in the main has practically solved the commercial riddle with which the country was entangled."

I need not labour the point further as I think that I have said enough to show that the "distraction of transhipment" is an evil that should be avoided in this State if it can be done without undully retarding the construction of new lines. The capacity of a railway is determined less by its gauge than by the loads it will carry and a heavy 2 feet 6 inches gauge line up to metre gauge axle loads is an anamoly as a feeder to a metre gauge line of light or moderate carrying capacity.

For a feeder to a metre gauge line a light railway on the same gauge fit to take the main line wagons at a slow speed is all that is wanted. Owing to the unbalanced forces the driving wheels of the locomotive stress the rails and bridges to a much greater extent than the wheels of wagons that only roll with very little pounding effect. There is no need to make the metre branch any stronger than the 2 feet 6 inches if we provide light engines. The following statement shows the comparative cost of a metre and 2 feet 6 inches line estimated for the same section of 30 miles and both equal to 8 ton axle loads :—

	Metre gauge	2'--6" gauge
	Rs.	Rs.
Preliminary expenses	1,200	1,200
Land	30,000	30,000
Formation	1,14,000	95,700
Bridge work	92,950	74,760
Fencing	21,000	21,000
Ballast and permanent way	5,10,000	4,88,850
Station buildings	90,000	90,000
Plant	24,000	24,000
Rolling stock	1,80,000	1,20,000
General charges	60,000	60,000
Total ...	10,93,150	10,16,310
Per mile roughly ...	37,000	34,000

If in both lines the working expenses are taken at 50 per cent of gross receipts, 4 per cent on the capital will be obtained if the metre gauge earns Rs. 57 a mile a week and the 2 feet 6 inches gauge Rs. 52·3 a mile a week.

An increase in earnings is to be expected and Rs. 57 a mile a week is a moderate estimate. But even if the earnings remain the same, there will a saving in working expenses on the metre gauge line owing to elimination of transhipment and reduction in maintenance charges for rolling stock. If we assume that the metre gauge is worked at 50 per cent of receipts and that the 2 feet 6 inches gauge is worked at 54 per cent, and that each line earns Rs. 57 a mile a week, the gross earnings a mile per annum will in each case be Rs. 2,964. The net earnings of the metre gauge will be 50 per cent of Rs. 2,964-Rs. 1,482-4 per cent of capital cost

of Rs. 37,000. Similarly the net earnings of the 2 feet 6 inches gauge will be 46 per cent of Rs. 2,964-Rs. 1,363-4 per cent of capital cost of Rs. 34,000. On the whole, taking increased earnings and reduced working expenses into consideration, the return on the metre gauge should be just as good as, if not better, than the return on the 2 feet 6 inches gauge and we get a line easier to work and more convenient and comfortable for the public.

In the above estimate I have taken the same rails 41¼ lbs., and the same girders for each line and have thus compared an ordinary 2 feet 6 inches line with a light metre gauge one. The metre gauge has the advantage that it can be more readily raised in standard as traffic increases, it also has the great advantage that during a rush of traffic, as during a famine for instance, foreign stock can be run on to the line and it is unnecessary to keep it eqipped with sufficient stock to deal with an emergency. The removal of transhipping difficulties should lead to an increase of traffic that will more than pay its share of the small increase in Capital expenditure. In my opinion there can be little doubt that the accepted principle of confining as far as possible 2 feet 6 inches feeders to 5 feet 6 inches main lines and taking metre gauge feeders off metre gauge lines is the correct one. For forest tramways and lines of light traffic that have to be laid on a road with weak bridges a light 2 feet gauge line will sufficiently answer requirements. This will leave us with two gauges to deal with, the metre and the 2 feet. The extension of the 2 feet 6 inches gauge is an undesirable complication that will add to the difficulties of up keep and hamper traffic.

In conclusion, I have no hesitation in expressing the opinion that the State-owned railways in future will be a better paying and all round more valuable property if the policy of making 2 feet 6 inches gauge lines is abandoned and the metre gauge is accepted as a standard. The increased cost of construction may retard the rate of construction a little but the wider gauge has advantages which will more than make up for this in the course of time.